National Aeronautics and Space Administration

Langley Research Center's

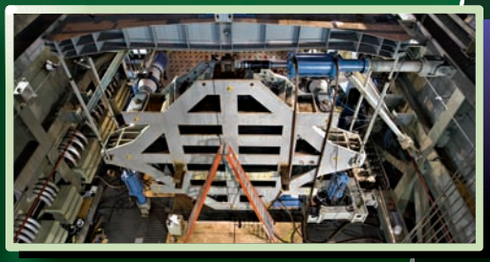
Combined Loads Test System (COLTS)

The Combined Loads Test System (COLTS) facility at NASA Langley Research Center is designed to validate new or unique structures technologies. COLTS can easily produce quasi-static and cyclic-loading conditions on large curved panels and cylindrical shell structures.

Realistic flight loads on aircraft and space structures can be simulated using a combination of mechanical, internal-pressure and thermal loads. The COLTS test chamber may also be configured for non-aerospace applications by adjusting its mechanical, pressure and thermal-loading capabilities.

COLTS users are also able to select from a comprehensive set of capabilities for data acquisition. In order to accommodate the complex nature of mechanical and thermal loading on a particular study article, the data-acquisition system has been designed to provide comprehensive real-time and post-processing of test data.



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Facility Benefits

- The test machine is located in a steel-reinforced concrete pit approximately 32 ft deep, 47 ft wide and 72 ft long that provides pressure containment for pressure-loaded structures
- The self-reacting loading platens can accommodate variable-length test articles
- Up to 32 hydraulic actuators can apply axial, torsion and shear load simultaneously
- COLTS can react up to 300,000 lbs. at several locations on floor and walls
- A pneumatic system provides continuously variable pressure loading
- Combined mechanical, internal pressure and thermal loads can be applied
- Quasi-static and cyclic mechanical and pressure-load simulations are possible
- COLTS can accommodate curved panels up to 10 ft long and 8 ft wide using the D-Box test fixture
- Cylinders up to 15 ft in diameter and 42 ft long can also be accommodated

Facility Applications

- Next-generation aircraft fuselage structures
- Structures with combined load requirements
- Space-vehicle structures and components
- Spacecraft systems

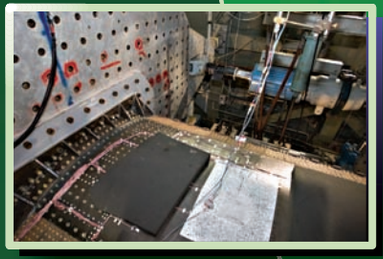
Research Projects Supported

- Structural integrity issues related to metallic aircraft structures under NASA's Aircraft Structural Integrity Program
- Development of high-speed civil-transport structures technologies under NASA's High Speed Research Program
- Progressive-damage studies on composite-fuselage structures under NASA's Supersonics Project
- Verification of the structural integrity of a composite crew module under NASA's NESC Composite Crew Module Project

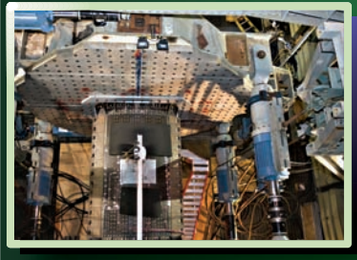
Capabilities

Combined mechanical, internal pressure and thermal loads
Axial loads up to 2,700,000 lb
Shear loads up to 600,000 lb
Torsion up to 6,600,000 ft-lb
Pressure loading up to 22 psig
Cyclic mechanical and pressure loading
Thermal loading
Video Image Correlation capability (VIC3D)

Data Acquisition and Processing



Data acquisition	2,048 channels
	100 KHz scanning capability
	Real-time and post-processing
Control system	User control of up to 32 actuators
	Continuously variable pressure control is available



Contact Information

Chief Engineer for Test Operations Excellence
Ground Facilities and Testing Directorate (GFTD)
GFTD Main Office, Mail Stop 225
NASA Langley Research Center
Hampton, VA 23681
(757) 864-6885
larc-dl-gftd@mail.nasa.gov
http://gftd.larc.nasa.gov

FS-2010-07-183-LaRC